



## Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact [support@jstor.org](mailto:support@jstor.org).

by "assimilating" the net-work of the egg. Thus the star, so remarkably distinct in these snail eggs, about the centrosome of the sperm is to be regarded as at first of male origin and then as gradually getting control of the net-work protoplasm, or the archoplasm, of the egg so that it is eventually the centre of an entire rearrangement of this egg material focussed about the male centrosome.

The centrosome next the female nucleus disappears and the star about it is "assimilated" by the star that arose about the male nucleus. Sooner or later the male star and centrosome divide to furnish the two-centered system concerned with division of the cleavage nucleus. The male and female nuclei unite to make the cleavage nucleus and the two protoplasmic stars do all that remain to be done in the subsequent cleavage.

The substitution of the new male system for the effete female system of radiate protoplasm is regarded as so complete that the chromosomes in the female nucleus become subjected to the domination of the male system by the growing male radii attaching themselves to these chromosomes by a process of "assimilation" of the old connections, that the author believes to exist between the female chromosomes and the female centrosomes. It is assumed that this male system is all along connected with the chromosomes of the sperm head and that the contraction of the radii draw the sperm head toward the female nucleus.

Along with the reduction of the chromosomes in both egg and sperm there is probably a reduction in the mass of so-called achromatic substance so that in fertilization there may well be restitution of the normal amount by a mutual supplying of the deficiency.

It will be seen that this conception of the process of fertilization is that of Boveri except that the centrosome is regarded as of no importance and the surrounding, radiated protoplasm becomes the essential factor for cell division. The authors follow Heidenhain in regarding the centrosome as merely the point of insertion of that active, contractile part of the cell that radiates out from this centre.

---

## PSYCHOLOGY.<sup>1</sup>

**The Effects of Loss of Sleep.**—Prof. Patrick and Dr. Gilbert, of the University of Iowa, have reported in the *Psychological Review* some experiments on this problem. Three normal subjects were kept awake for a period of ninety hours, without resort to stimulants or other

<sup>1</sup> Edited by H. C. Warren, Princeton University, Princeton, N. J.

physiological means. During the four days and three nights of the test they were engaged, as far as possible, in their usual occupations; their meals were of the customary kind, and were taken at the ordinary times, with the addition of a light lunch at about midnight. At intervals of six hours a series of tests was made on each subject, to determine his mental and physical condition. To eliminate the effects of practice, these tests were begun three days before the experiment. The test of the first day of experiment, before any loss of sleep had actually occurred, represent the normal condition of the subject. Tests were also made after the night's sleep that followed the conclusion of the experiment. One of the writers was the first subject. The two other subjects were instructors in the university; the latter were experimented upon at the same time.

Some of the results are of special interest. The reaction time (for sound) showed a gradual increase for two of the subjects, which was masked in the third case by increase of practice; at one period (different in the three cases) the time was considerably greater than earlier or later in the experiment; the mean variation was somewhat above the normal, but not remarkably great. The acuteness of vision, measured by the distance at which a page of print could be distinguished and read, actually increased during the progress of the experiment, and fell off again after the ensuing sleep. The memory test of the two last subjects consisted in committing random series of figures; the time required for this memorizing fluctuated considerably, with a marked lengthening towards the close of the experiment. One of the subjects was unable to memorize the figures at all at two of the last day's tests; he found it impossible to hold the attention upon the task long enough to complete it. The time consumed in adding sets of figures was fairly constant, with two or three exceptions; it was apparently independent of the memory conditions. "Voluntary motor ability," tested by the number of taps that could be made with the finger in five seconds, showed no marked alterations; neither did the susceptibility to fatigue, as tested by continuing this tapping for sixty seconds. The strength of grip, measured on the squeeze dynamometer, fell off from 20 to 30 per cent. at the end of the second day, but afterwards recovered—in two cases fully, in the other partially. The weight of the men remained fairly constant, showing a slight increase towards the close of the period, and the variation of the pulse was within the normal range of daily fluctuations.

The first subject suffered from marked visual hallucinations after the second night. "The subject complained that the floor was covered with

a greasy-looking, molecular layer of rapidly moving or oscillating particles. Often this layer was a foot above the floor and parallel with it, and caused the subject trouble in walking, as he would try to step up on it. Later the air was full of these dancing particles, which developed into swarms of little bodies like gnats, but colored red, purple or black. The subject would climb upon a chair to brush them from about the gas jet, or stealthily try to touch an imaginary fly on the table with his finger. These phenomena did not move with movements of the eye and appeared to be true hallucinations, centrally caused, but due no doubt to the long and unusual strain put upon the eyes. Meanwhile the subject's sharpness of vision was not impaired. At no other time has he had hallucinations of sight, and they entirely disappeared after sleep." Neither of the other subjects experienced these hallucinations.

At the close of the experiment the subjects were allowed to sleep as long as they desired. Tests were made upon the first subject, however, at hourly intervals during the first night, to determine the depth of his sleep. He awoke naturally after ten and a half hours, and remained awake during the rest of the day, but slept two hours more than his normal amount the second night. Of the other subjects, one awoke of his own accord after eleven, the other after fourteen hours' sleep; both felt quite refreshed; they required no extra sleep the next night, and felt no ill effects from the experiment.

It will be noticed that the sleep made up was but a small proportion of the amount lost, viz., 16, 25 and 35 per cent. in the three cases respectively. Two possible explanations for this are offered: either a greater depth of sleep may make up for a lesser duration; or sleep is a relative phenomenon, and the subjects, while apparently awake, were in reality partially asleep at times during the experiment. The authors believe that both of these facts are true, and that they operated together in the present instance. While the subjects were not allowed to go to sleep for an instant, and the slightest tendency to close the eyes was met by active measures, still there were indications of the presence of dreams, in lapses of memory and occasional irrelevant remarks. "It must be understood," say the writers, "that these dreams were instantaneous and the subject as wide awake as he could be kept; but these facts reveal a cerebral condition related to sleep. This hypothesis alone, however, would not seem to account fully for the small proportion of sleep made up. And, indeed, a study of our special tests shows that restoration took place chiefly during the profound sleep following the sleep fast, and took place rapidly. That this sleep was actually more profound, and that the profound part of it was longer than usual, was shown by our experiments in depth of sleep," on one of the subjects.

The authors think it would have been possible to prolong the experiment beyond the ninety hours without danger, except in one of the three cases. These results contrast favorably with those obtained by M. de Manacéine upon young dogs. The animals were kept from sleeping and died at the end of the fourth or fifth day.—H. C. WARREN.

---

## PROCEEDINGS OF SCIENTIFIC SOCIETIES.

**American Philosophical Society.**—November 6, 1896.—The following communications were made: "Recent Archæological Explorations on the Shell Keys and Gulf Coast of Florida," by Frank Hamilton Cushing, followed by Dr. D. G. Brinton and Prof. F. W. Putnam.

November 20, 1896.—Prof. H. V. Hilprecht addressed the Society on his recent archæological discoveries at Nippur, and exhibited a collection of tablets with Summerian inscriptions. A paper on "A New Physical Property of the X-Ray," by Charles L. Leonard, M. D., was read.

**University of Pennsylvania, BIOLOGICAL CLUB.**—November 2, 1896.—The following demonstrations were made; Descriptive Exhibitive of *Streptocarpus* and *Ephedra* by Dr. J. M. McFarlane and of *Botrychium* by H. C. Porter. The following communication was made; School Museums, by Mrs. L. L. W. Wilson.

H. C. PORTER, *Secretary*.

**The Biological Society of Washington.**—The following communications were made; Theodore Gill, "The Category of Family or Order in Biology;" C. Hart Merriam, "Notes on the Fauna of Oregon;" E. A. DeSchweinitz, "Some Methods of Generating Formaldehyde, and its Use as a Disinfectant;" C. Hart Merriam, "Supplementary Notes on Tropical American Shrews.

November 21st.—The following communications were made: G. H. Hicks, "The 'Mildews' (*Erysiphææ*) of Michigan;" Frederick V. Coville, "The Inflorescence of the *Juncaceæ*;" Theodor Holm, "The Alpine Flora of Pikes Peak and Grays Peak in Colorado;" C. L. Pollard, "Some Further Remarks on Britton and Brown's Illustrated Flora."

FREDERIC A. LUCAS, *Secretary*.